

REMARKS

Claims 1-11 are pending in the application. Claims 1, 2, 4-7, 10 and 11 are rejected. Claims 3, 8 and 9 are objected to for being dependent on a rejected base claim but would be allowable if rewritten into independent form. The drawings are objected to and claims 1-11 are objected to for specified informalities.

Applicants amend the application as set forth above and request reconsideration in view of the following remarks.

Drawings

The drawings are objected to because Figs. 1-2 do not have a legend such as "Prior Art" but illustrate only that which is old.

In response, Applicants amend Figs. 1-2 as suggested in the Office Action.

Specification

Applicants amend the specification as shown above to capitalize the name Sagnac, change "polarization sustaining fiber" to read "polarization maintaining fiber," and correct the expressions of an inequality whose printing in the translation omits a minus sign. A similar change is made to the inequality recited in claim 8.

Claim Objections

Claims 1-11 are objected to for specified informalities.

In response, Applicants amend the claims as follows:

The term "optical directional coupler" that was recited in claim 1 is changed to read "first optical branch unit" so that first and second optical branch units are now recited.

Claim 4 is amended to overcome the objection to the word "second" in "second optical branch unit" and the second and third depolarizers are changed to read first and second depolarizers, respectively.

Claim 9 is amended to correct the misspelling of "unit."

Claim Rejections Under § 112

Claims 10-11 are rejected under 35 USC § 112, second paragraph, for being generally narrative and indefinite.

In response, Applicants amend claims 10-11 as shown above and also amend claims 2 and 4 to recite claimed features in distinct paragraphs.

Claim Rejections Under § 103

Claims 1, 2, 4-7, 10 and 11 are rejected as being unpatentable over specified prior art. Applicants request reconsideration in view of the following remarks.

Claim 2

Claim 2 is rejected under 35 USC § 103 for being unpatentable over admitted prior art in view of US patent 5,365,337 (referred to as "Page"). The Office Action indicates the combination as applied to claim 1 shows all that is claimed except for the depolarizer and polarization filter in each branch of the second optical branch unit; that Page shows these missing components; and that it would have been obvious to use redundant depolarizers and polarization filters. The alleged motivation to use these redundant components is explained in the Office Action as follows:

- (a) Page teaches that other optical elements in Sagnac interferometers such as beam splitters/recombiners and optical couplers repolarize optical signals causing errors in the interferometer, thus suggesting to a skilled artisan that redundant depolarizers and polarization filters placed after error causing elements would further reduce the unwanted polarization changes.
- (b) One of ordinary skill in the art would have placed a redundant depolarizer and a polarization filter in each branch of an optical branch unit so that the interferometer is more accurate in its measurements.
- (c) The skilled artisan would have placed one of the depolarizers and polarization filters after the optical phase modulator to remove unwanted polarization changes caused by the optical phase modulator.

Applicants respectfully disagree for reasons that are explained below.

Page teaches an interferometric gyro that uses a Sagnac-effect phase shift to detect rotation. Page states the object of the disclosed invention, which is to provide an optical gyro having a low bias error and in which the effects of birefringence are minimized (col. 3 lns. 11-16). This object is achieved by "the insertion of a birefringence compensating optical component (col. 3 lns. 16-17). More specifically, "one or more compensation components are added with a predetermined amount of birefringence along an axis oriented to cancel the net birefringence effect of the other components in the optical gyro system" (col. 3 lns. 24-27).

Contrary to what is alleged in the Office Action, Page does not disclose or suggest inserting a polarization filter in each branch of the optical branch unit. Instead, Page teaches the following (see col. 6 ln. 66 to col. 7 ln. 3):

... Additional depolarizers 216, 217 may be interposed between the beam splitter 212 and the optical ring 220. Depolarizer 202 functions to compensate for birefringence of the source and depolarizers 216 and 217 serve to compensate for birefringence of the optical ring 220.

Page clearly teaches the function served by these depolarizers. There is no mention of a polarization filter. Indeed, the use of a polarization filter would destroy the function served by the depolarizers.

Furthermore, if the motivation that is alleged in the Office Action was true, then the compensators taught in Page would either be unnecessary or they would be affected in their design. Page does not indicate or suggest that either situation is true.

Claim 4

Claim 4 is rejected under 35 USC § 103 for being unpatentable over admitted prior art in view of Page and further in view of US patent 6,563,589 (referred to as "Bennett"). The Office Action indicates the combination of the admitted prior art and Page as applied to claim 2 shows all that is claimed except for a light source that emits non-polarized light; that Bennett shows a Sagnac interferometer in which the light source is a light emitting diode; and that it would have been obvious to use the light source disclosed in Bennett.

Applicants respectfully traverse the rejection of claim 4 for the same reasons discussed above for claim 2.

Claim 5

The Office Action indicates the combination of art as applied to claim 4 shows all that is claimed in claim 5 except for depolarizers having group delays with a ratio of 1:2; and that Page (col. 5 lns. 21-32) discloses this feature.

Applicants disagree. The text in Page that is referred to in the Office Action describes the construction of a Lyot depolarizer consisting of two birefringent crystals whose thickness have a ratio of 2:1. This ratio refers to relative thicknesses of crystals within a single depolarizer and does not refer to group delay nor to relative characteristics of different depolarizers. This text is not relevant to what is claimed.

Claim 8

Claim 8 is rewritten into independent form that includes nearly all of the limitations of the base claims upon which it depended.

Claims 10-11

Claims 10-11 are amended to be dependent on multiple claims, which are discussed above. These claims are patentable over the cited art for the reasons discussed above.

CONCLUSION

Applicants amend the application and request reconsideration in view of the remarks set forth above.

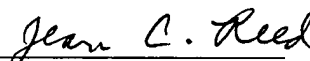
Respectfully submitted,



David N. Lathrop
Reg. No. 34,655
601 California St., Suite 1111
San Francisco, CA 94108-2805
Telephone: (415) 989-8080
Facsimile: (415) 989-0910

Certificate of Mailing Under 37 CFR 1.10

I certify that this Response to Office Action and all enclosed materials are being deposited with the United States Postal Service on March 2, 2004 as "Express Mail," mailing label EV 326498997 US, in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.



Jean C. Reed

Enc. Figs. 1-2
Check for \$600
Information Disclosure Statement with form PTO-1449
Copies of cited references